

Amendment of Claims: Please amend the claims as indicated in the attached listing of claims.

The present claims which are directed to methods of increasing water deficit tolerance in plants by expression of a transcription factor with amino acids having at least 50, 80, 90 or 100% identity to SEQ ID NO:1, and to transgenic seed for growing water deficit crop plants wherein the seed comprises recombinant DNA for expression of a transcription factor with amino acids having at least 50, 80, 90 or 100% identity to SEQ ID NO:1. The claims are supported in the specification and claims as filed.

Specifically, see page 2, lines 13-15, for support of the addition to claim 8 that specifies that the method is “imparting water deficit tolerance” and that the crop plant is “transgenic”. See 12, lines 19-20, for support of the addition that of a screening step to claim 8. The specification at pages 7, line 25 to page 8, line 2 describes transcription factors for use in the present invention where the transcription factor polypeptides have 50, 80, 90 or 100% identity to SEQ ID NO:1.

More specifically, support in claims 8 and 10 and in new claim 20 for specifying that the transcription factor as having “amino acids with at least 50% identity to SEQ ID NO:1” is found at page 7, lines 26-31. In this regard the amino acid sequence of the rice transcription factor presented as SEQ ID NO:2 is 56% identical to SEQ ID NO:1 the amino acid sequence of homologous *Arabidopsis* transcription factor identified as G1073.

Support for the characterizations “amino acids with at least 80% identity to SEQ ID NO:1” found in new claims 14, 17 and 21, “amino acids with at least 90% identity to SEQ ID NO:1” found in new claims 15, 18, 22, 23 and 24, and “amino acids of SEQ ID NO:1” found in new claims 16, 19 and 22 is found at page 7, lines 26-31.

Support for new claims 20, 23 and 24 is generally found at page 11, lines 14-30, with specific support for the identity to SEQ ID NO:1 found at page 7, lines 26-31.

Furthermore, Applicants describe generally at page 7 lines 1-24, functional homolog proteins that differ in one or more amino acids due to, for example, conservative amino acid substitutions or insertions or deletions in a native sequence. The use of polynucleotides encoding G1073 and homologous transcription factors for production of water deficit plants is described, for example, at page 8, lines 7-10. Transgenic seed useful for production of water deficit tolerant crop plants is described at page 11, lines 9-12.

No new matter is added with the present amendments and new claims and the Examiner is respectfully requested to enter the amendments in the present application.

Section 112 Rejections - indefiniteness: Claim 12 remains rejected under 35 U.S.C. 112, as being indefinite for failing to particularly point out and distinctly claim the subject matter in which applicant regards as the invention.

Claim 12 has been amended to recite “pest resistance”. Withdrawal of the indefiniteness rejection is respectfully requested.

Section 112 Rejections – written description: Claims 8-13 remain rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. In particular the Examiner suggests that the subject matter is not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the invention was filed, had possession of the invention. The Examiner notes that

“...the asserted consensus amino acid sequence of SEQ ID NO:11 appears to be directed to a portion of a DNA binding site, and not specifically to a consensus amino acid sequence that describes the common specific function of provide the water-deficit-tolerance trait. The Examiner notes that claims 1, 5, 6 and 9-13 do not recite any function for a recombinant DNA which expresses a transcription factor comprising the consensus amino acid sequence of SEQ ID NO:11...”

Office Action at page 3.

Applicants respectfully traverse this rejection and note that the present application describes water deficit tolerant Arabidopsis and soybean plants resulting from expression of the transcription factor with amino acids of SEQ ID NO:1 and discloses sequence of homologous transcription factors from rice, cotton and Arabidopsis. Applicants also describe a consensus amino acid region, the presence of which sequence may be used to assess the ability of a transcription factor homolog of the present invention to provide the water deficit tolerance trait.

The Patent Office relies on Aravind *et al* (NAR 26:4413-4421 (1998) in its assertion that the consensus sequence of SEQ ID NO:11 is directed to a DNA binding site and not to a sequence that describes the common function of providing the water deficit tolerant trait.

Applicants respectfully note that the consensus sequence of SEQ ID NO:11 does not contain the AT-hook domain noted in the Aravind publication, but rather begins directly after the AT-hook domain in the G1073 and related transcription factors. See attached Pfam analysis results. Thus, the fact that Aravind discloses a large number of proteins comprising AT-hook domains with varying functions does not teach or suggest that transcription factors with conserved domain,

identified by Applicant provide the common function of imparting water deficit tolerance to transgenic plants as disclosed in the present application.

Furthermore, Applicants provide a declaration from Dr. Paul Chomet demonstrating the production of water deficit tolerant corn plants by transformation with recombinant constructs for expression of the G1073 transcription factor of SEQ ID NO:1, a rice transcription factor comprising the amino acid sequence of SEQ ID NO:2 and a soy transcription factor with the designation of soy DUF296 (PHE0003447). G1073 and the rice transcription factor sequence of SEQ ID NO:2 are 54% identical as demonstrated in the sequence alignment and sequence pair distance report provided with this response. PHE0003447 also has 54% identity to G1073 as also shown in the sequence alignment report. This evidence supports Applicants' teaching in the present application of the function of G1073 and homologous transcription factor sequences for production of water deficit tolerant plants. Applicants note that the rice transcription factor sequence provided in the specification is a partial sequence and that the sequence in the transgenic plants addressed in Dr. Chomet's declaration contains the full length sequence comprising an additional 41 amino acids at the N-terminus of the protein.

Applicants note that the present claims are directed to methods of increasing water deficit tolerance in plants by expression of a transcription factor with amino acids having at least 50, 80, 90 or 100% identity to SEQ ID NO:1, and to transgenic hybrid corn seed for growing water deficit crop plants wherein the seed comprises recombinant DNA for expression of a transcription factor with amino acids having at least 50, 80, 90 or 100% identity to SEQ ID NO:1. Such claims are clearly supported, for example in the specification at pages 7, line 25 to page 8, line 2 which describes polypeptides having 50, 80, 90 or 100% identity to SEQ ID NO:1. Furthermore, Applicants describe generally at page 7 lines 1-24, functional homolog proteins that differ in one or more amino acids due to, for example, conservative amino acid substitutions or insertions or deletions in a native sequence.

One skilled in the art would clearly understand that the present application extends to homologs and variants of the G1073 sequence having substitutions outside of the functional conserved domain region. Further, Applicants note that the consensus sequence provided in the specification teaches that certain amino acids could be substituted within the functional domain itself. Please see the expanded description of SEQ ID NO:11 provided herein that translates the

sequence listing language into a more readily viewable format and demonstrates that substitutions at 37 of the 108 amino acids in the conserved region are disclosed in this invention.

Thus, the present application discloses a number of native homologs and a multitude of specific variant proteins that can be used to provide the water deficit tolerant plants of the present invention. In view of the above, Applicants submit that the present application satisfies the written description requirement of 35 U.S.C. 112, first paragraph and respectfully request that the rejection be withdrawn.

Section 112 Rejections – enablement: Claims 8-13 remain rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. In particular the Examiner suggests that the claims contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The Examiner more particularly says

“Applicants provide no evidence that SEQ ID NO: 8, 9 or 10 confers a water-deficit-tolerance trait in a transgenic plant...Examiner notes that claims 1, 5, 6 and 9-13 do not recite any function for a recombinant DNA which expresses a transcription factor...hence Applicants are arguing a limitation not found in these claims...”

Office Action at page 5.

Applicants respectfully traverse this rejection to the extent that it is maintained for the present claims which are directed to methods of increasing water deficit tolerance in plants by expression of a transcription factor with amino acids having at least 50, 80, 90 or 100% identity to SEQ ID NO:1, and to transgenic seed for growing water deficit crop plants wherein the seed comprises recombinant DNA for expression of a transcription factor with amino acids at least 50, 80, 90 or 100% identity to SEQ ID NO:1.

The declaration of Dr. Paul Chomet as discussed above, demonstrates that expression of a transcription factor with amino acids of SEQ ID NO:1, a rice homolog transcription factor with amino acids comprising SEQ ID NO:2, (which is 54% identical to SEQ ID NO:1), and a soy transcription factor having 54% identity to SEQ ID NO:1 provide water deficit tolerance in transgenic hybrid corn plants. Furthermore, Applicants direct the Examiner’s attention to a later patent application of Mendel Biotechnology, a research partner, that discloses the use of additional G1073 homolog proteins to provide water deficit tolerance in transgenic plants. See

PCT application publication WO 2005/030966 Table 1 (beginning at page 25) and Example 7 (beginning at page 80) which provides results of stress tolerance assays, including tolerance to dessication for a number of Arabidopsis and crop homologs of G1073 that fall within the scope of the presently claimed invention. In particular, results with G1067, provided in the present application as SEQ ID NO:12, are described at page 83, lines 23-25 for disclosure of the use of G1067 for production of drought tolerant plants. G1067 is 53% identical to G1073 as demonstrated in the alignment accompanying this response. Applicants note that the Chomet declaration indicates that transgenic corn plants expressing G1067 have not yet been demonstrated to have enhanced water use efficiency phenotypes by the construct level results provided.

Although phenotypic results may vary depending on the promoter used for expression as noted in Dr. Chomet's declaration and the Mendel application, the evidence clearly demonstrates the use of a G1073 related sequences for production of transgenic plants having improved water deficit tolerance. Applicants note that the instant specification addresses the use of various plant promoters for expression of the G1073 and related transcription factors of the present invention at page 8, line 20 through page 9, line 18.

Applicants submit that a person of ordinary skill in the art is more than capable of making a transgenic plant, conducting a water deficit screen, and identifying a transgenic event exhibiting water deficit tolerance. What Applicants have provided is that a specific transcription factor, G1073, can be used to generate such water deficit plants and that related G1073 homologs that can be used in a similar manner may be identified by identity to G1073, particularly in the consensus sequence region identified in the present application. Reconsideration and withdrawal of the enablement rejection is respectfully requested.

Section 102 Rejections : Claims 8-9 stand rejected under 35 U.S.C. 102(e) as being anticipated by Jiang (U.S. Patent 6,717,034 B2, filed 30 March 2001). The Examiner more particularly says

"Jiang discloses a method of inserting into the genome of a plant a recombinant DNA which expresses a transcription factor having consensus amino acid sequence of SEQ ID NO:11...a transgenic plant produced therefrom...a transgenic seed for growing a transgenic plant and a method of making a hybrid plant by crossing a transgenic plant with another plant...said transgenic seed and plant having herbicide resistance...The trait

of water deficit tolerance appears to be inherent in the disclosed recombinant DNA disclosed by Jiang. Hence, Jiang had previously disclosed all of the claim limitations.”
Office Action at page 6-7.

Applicants respectfully request reconsideration of this outstanding rejection of claims 8 and 9.

By amendment herein, the method of claim 8 requires the additional step of screening transgenic plants comprising the transcription factors of the present invention in a water deficit screen. Jiang is directed to plants having the visual phenotype of increased biomass and does not inherently disclose a method of imparting drought tolerance to a transgenic plant that includes the step of screening to identify the drought tolerance trait. Applicants request withdrawal of the Section 102 rejection.

Section 103 Rejections: Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang (U.S. Patent 6,717,034 B2, filed 30 March 2001) in view of Barry *et al* (U.S. patent 5,633,435).

The specification has been amended to reflect the joint research agreement between Monsanto Company and Mendel Biotechnology which was in existence at the time the present invention was made. Applicants respectfully submit that the Jiang reference is disqualified as prior art available under Section 103 and request that the Section 103 rejection be withdrawn.

Summary Applicants believe that the above amendments and comments address the outstanding rejections. Reconsideration and withdrawal of all of the rejections is respectfully requested.

Respectfully submitted,

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